

RESEARCHES REGARDING THE SPECIES OF PLANTS FROM THE SANDS IN THE NORTH-WEST OF ROMANIA

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ABSTRACT. The latest scientific flora research (researches accomplished on the continental sands from the North-West region of the country), emphasized that there are compositional changes of the vegetal layer. In the experimental stations, the natural surfaces suffered a restriction, especially in the case of semi-fixed sand hills. This contributes to a numeric reduction of plants. The sand hills' peculiar vegetation was affected by the expansion of some ruderal plants and weeds, with a local invasive character. The recent increase of dereliction areas influences negatively the persistency of specific rare species. Under these circumstances, during 2008, some rare species were rediscovered; some of them have not been signalized during the last 30 years, being considered disappeared from the flora in the North-West of Romania.

Keywords: semi-fixed sand hills, ruderal plants, invasive character, flora of sands

INTRODUCTION

Situated in a plain region, the continental sands in the North-West of Romania lie along the North-West border, occupying one third of the total sands' surface of our country. The rest of it (called Nyirség) belongs to Hungary. The Romanian side is known in the geographical literature under the name of Nirului Plain and represents a peculiar geomorphologic unity of The Banato - Crișano Plain.

The Nirului Plain has a total surface of 27.000 ha (26.390 ha), occupying the Western extremity of Satu Mare and Bihor counties. The geographical coordinates of the territory are: $47^{\circ}45'$, near Urziceni – Pădure (to the North) and $47^{\circ}26'$, near Voivozi (to the South) - Northern Latitude, respectively $22^{\circ}1'$, opposite to the village Șiman and $22^{\circ}22'$ at Foieni -East Latitude. This sandy land is bordered at North by Ecedea meadows, at East by Careiului Plain, at South by Ierului Valley and at West; the border coincides with the country's frontier between Hungary and Romania. The relief with fluvial sands has been modeled starting with The Superior Pleistocene and Holocene.

Geomorphologic unity, the Nirului Plain is framed by high plains from the Western depressions of the country. A particularity for this relief is the presence of sand hills ranges, with a general orientation NNE-SSV, alternating with lower areas of inter sand-hills. The old sand banks were subdued to erosion and covered by eolian reshuffled sands. Thus, it formed a complex of high sand hills. Simultaneously, it formed a system of even lower and younger sand hills in the micro-depressions areas.

The high relief is drained. Consequently, it formed a discontinuous net of swampy lands in certain lower areas from the inter-sand hills. Nowadays wind deflation determines the sands dissemination, especially on the peak of the hills. In this situation, the plough lands down the slope favorites the torrential erosion, creating thus sources for the sand stabilization. The sands hills are flattened-peak shape, prolonged and

parallel. The longitudinal axis of the main sand hills reaches 1-1.5 km and the breadth of 100 - 400m.

The Nirului Plain reaches the absolute altitude (155-160 m) in the Western and Central sides of the territory. The highest point (160 m) lies on a long peak, in the lands of Sanislău, near the border. The cover sand thickness goes beyond 20-25m and the distances among the ranges of hills grow from West to East (200-250 m to 800-1000 m) in the region Ciumești-Berea (Benedek, 1969). In the center of the territory, the main sand hills reach heights of 5-20 m, but are lower near the borders of the territory.

The underground waters of Nirului Plain are cantoned in the strata of "blue sands" (prehistoric hills, situated almost on the surface, 70-80m - thickness). There is a water accumulation coming from the main rainfalls and underground drainages. Depending on the rainfall oscillations in the drought periods, the hydro status level of those water sheets decreases at the depth of 3 – 4 m and, in rainy seasons, it raises at 0,5 - 2m. The phreatic waters are situated almost on the surface, thus, the presence of those phreatic waters in swampy lands and the seasonal oscillation of hydrostatic level contribute to a regular local process of sinking into marsh.

The phreatic water contains a large amount of calcium carbonate, but also a big quantity of sodium in the superior layers. Situated in the middle of The Carpathian Basin, the Nirului Plain has a Central-European climate. The advective transfer and the atmospheric fronts movement are developing properly, without great perturbations or digressions from the general circulation regime, coming from the East side of the Pannonic Plain (in the North of Tisa Plain). The Climatic elements are characterized by important annual oscillations depending on seasons.

MATERIALS AND METHODS

The floristic research accomplished on two stages: research, fieldwork and laboratory work. Thus, we firstly performed scientific research on the fieldwork,

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and secondly, in the scientific laboratory. The fieldwork analysis has been accomplished in one year upon successive samplings. During this period, we identified and harvested the encountered species. In the case of unknown sample species, we harvested them in order to identify and name them in the laboratory, through a peculiar catalogue for determining species or varieties (Flora Mică și Ilustrată a României, Vasile Ciocârlan; Flora Europaea; Flora R.P.R./R.S.R.).

After the registration of the plants we performed the harvested taxa' determination, the drafting of the general floristic survey and flora analysis. This was taken into account from a phylogenetic, geological and biological point of view. Moreover, data from some plant collections are also used.

RESULTS AND DISCUSSIONS

The outcome of the scientific researches illustrates that the superior plants implements consists on 1156 taxa, belonging to 102 families. Among these, the most numerous species are: Asteraceae – 133; Poaceae – 98; Fabaceae – 65; Cyperaceae – 57; Lamiaceae – 51; Caryophyllaceae – 47; Scrophulariaceae – 45; Brassicaceae – 43; Ranunculaceae – 40; Apiaceae - 38 species.

Among the rare floristic elements in the territory, we sampled *Iris arenaria* Waldst. et Kit; *Onosoma pseudarenarium* Schur. subsp. *tuberculatum* (Kit.) Rauschert; *Pulsatilla flavescens* (Hazsl.) Borb. (syn. *Pulsatilla pratensis* (L.) Miller subsp. *hungarica* Soó; *Corynephorus canescens* (L.) Beauv.

Iris arenaria Waldst. et Kit (syn. *Iris humilis* Georgi subsp. *Arenaria* (Waldst. et Kit) A. et D. (Löve). In Romanian Flora, this extremely rare plant was lastly found in the fieldwork of Urziceni in 1978. In the previous decades, it was also registered in Sanislău (Resmeriță et al. 1971), Valea lui Mihai (Máthé, 1942) and Șimian (Dragu et al., 1966). Specific for the vegetation of fixed and semi-fixed sand hills (with its dispersal area in a progressive limitation), this geophyte was considered an element disappeared in the area.

11 floriferous samples were identified during 2008, at the "Grădina sailor" pasture, near Urziceni (fig.1). They are included in Table 1.

This population of *Iris arenaria* grows in a relatively compact group, on a no pastured sand hill, which was initially included on the reservation territory of Urziceni.

Onosoma pseudarenarium Schur. subsp. *tuberculatum* (Kit.) Rauschert. Formerly, it was signaled under the name of *Onosoma arenarium* Waldst. et Kit. from: Urziceni, (Buia, 1940), Foieni (Balász, 1943) and Pișcolt (Prodan, 1956) and later under the name above mentioned: in Sanislău, Horea and Scărișoara Nouă (Rauschert, 1976). Gradually, it disappeared. Nobody found it anymore in known research stations. It was lastly collected in "Grădina sailor" pasture from Urziceni in 1978. This plant was recovered in 2008 at Foieni, as a consequence to

repeated researches. Here, its localization is on the grassy slopes of the sand hills, in the peripheral sides of the reservation area (fig. 2); being represented by a limited number of samples.



Fig. 1 *Iris arenaria* Waldts. et Kit (Urziceni, 2008)



Fig. 2 *Onosoma pseudarenarium* Schur. subsp. *tuberculatum* (Foieni, 2008)

Pulsatilla flavescens (Hazsl.) Borb. (syn. *Pulsatilla pratensis* (L.) Miller subsp. *hungarica* Soó). For the continental sands of Nirului Plain, this subendemic species was formerly spread almost everywhere. Thus, it was firstly signaled in Urziceni (Buia, 1940), Foieni (Balász, 1943), Ciumești, Sanislău, (Resmeriță et al., 1971), Pișcolt (Prodan, 1956) and Valea lui Mihai (Máthé, 1942). In the last decades, it was regularly found only at Urziceni (fig.3) and Foieni. At Pișcolt it was registered for the last time in 1970.

Corynephorus canescens (L.) Beauv. This species was discovered relatively late in the flora of Romania and is spread in the whole area of sands, especially on the Southern and Westic sand hill slopes. Because of detailed research based upon its scattering in Nirului Plain (Karácsonyi, 1979), this plant appears to be largely distributed. An Atlanto-Mediterranean element, *Corynephorus canescens* is one of the associations edifying species. This association is situated in the

North-West of Romania and is characterized by semi-fixed sands –as. *Festuco vaginatae* – *Corynephoretum Soó* in Aszód 1935.



Fig. 3 *Pusatilla flavaescens* (Hazsl.) Borb (Urziceni, 2008)

As a consequence to the last years' research, this vulnerable association has perpetuated in many research stations, here and there on restrained surfaces. Thus, important populations of *Corynephorus canescens* were identified, not only at Voivozi, but also at Valea lui Mihai, Pișcolt, Sanislău and Ciumești. It seems that the decrease of used quantities of chemical improvement and fertilizers favorites the local perpetuation and even an expansion. A notable fact is that these species are sensitive to an accumulation of smaller amounts of carbonates in the soil.



Fig. 4 Asociația *Festuco vaginatae* – *Corynephoretum Soó* ex Aszód (Voivozi, 2007)

CONCLUSIONS

For the time being, the greatest forces of *Pulsatilla flavaescens* are concentrated at "Grădina Cailor", Urziceni. It grows on different grassy sections of a sand hill, sometimes in important quantities. There are only stray samples in the perimeter reservation of Foieni, but on a neighboring sand hill there is a pretty numerous population, accompanied by: *Helichrysum arenarium* (L) Moench, *Carex suspina*, Willd ex Reichenb., *Euphorbia seguieriana* Necker, *Plantago arenaria* Waldst. et Kit., etc.

Another vigorous population was recovered in June 2008 near Valea lui Mihai. For the last time, Karácsonyi notified this plant 30 years ago. In this region, *Pulsatilla flavaescens* grows near the vineyards, on the grassy slopes of the sand hills.

Many cenosis dominated by *Corynephorus canescens* are partially degraded, which involves a protection program within its spreading area. We should also mention that we found some other remarkable plants, in new research stations, excluding those 4 representative species. So, *Draba nemorosa* L. was identified in the "Grădina Cailor" grazing (Urziceni), *Chrysopogon gryllus* (L.) Trin., which was discovered on the northern purlieus of his once protected area in Pișcolt. *Angelica palustris* (Bess.) Hoffm. is another plant discovered on the swampy lands of the reservation called "Vermes" from Sanislău.

To conclude, a series of remarkable floristic elements are still preserved nowadays, despite the negative influences on the original vegetal layer in the last decades on the swampy lands from The North-West of Romania. Most of the floristic elements have been maintained in the stations included within the natural reservations, emphasizing the necessity of extending such protected areas.

REFERENCES

- Ardelean A., Mohan Gh., Botanică sistematică, Ed. „V. Goldiș” University Press, Arad, 2006
- Ardelean G., Karácsonyi C., Flora, vegetația, fauna și ecologia nisipurilor din nord-vestul României, Ed. Daya, Satu Mare, 2005.
- Balázs F., Adatok Nagykároly és környéke flórájának ismeretéhez, Scripta Bot. Mus. Transss., II, 1-3, 3- 30, 1943.
- Buia Al., Materiale pentru studiul fânețelor și păsunilor din regiunea Satu Mare – Sălaj, Bul. Acad. Agron. Cluj., VIII, (1939), 347-361, 1940.
- Dragu I., Babaga G., Gherasim V., Aronescu M., Semințele plantelor spontane colectate în cursul anului 1966, Delectus Seminum Hortus Botanicus Bucurestiensis, București, 1966.
- Karácsonyi C., Asociația *Festuco vaginatae-Corynephoretum* în România, St. cerc.biol. veget., 31, I, 3-12, 1979 .
- Máthé I., Előzetes florisztikai közlemények az Érmellékéről, Scripta Bot. Mus. Transss., I, 5-7, 83-85, 1942.
- Prodan I., Aspecte din vegetația zonei de vest a R.P.R., Bul. Știint., Secția biol. șt. agric., VIII, 1, 5-45, 1956.
- Rauschert S., Zur Nomenklatur und Chorologie des Formenkreises von *Onosma pseudarenarium*, Schur's. lat.", Folia Geobot. et Phytotax., Praha, II, 3, 269-279, 1976.
- Resmerită I., Spârchez Z., Csürös Șt., Moldovan I., Flora și vegetația nisipurilor din nord-vestul României, Comunic. Bot., București, XII, 187-195, 1971

Table 1

As. Potentillo arenariae-Festucetum pseudovinae Soó (1939) 1950**CHAR. ASS**

| | | | |
|--------------------------------|---------|-------------------------|------|
| H | Ecu (C) | Festuca pseudovina | 4 |
| H | Ec | Potentilla arenaria | +/-1 |
| FESTUCETALIA VALESIACAE | | | |
| G-H | Eua (C) | Poa bulbosa | + |
| Th | Atl-M | Vicia lathyroides | + |
| FESTUCION RUPICOLAE | | | |
| H | Eua (C) | Festuca rupicola | 1-2 |
| Ch | Ec (M) | Cynoglossum hungaricum | + |
| H | Pan | Pulsatilla flavaescens | + |
| Ch | Eua | Veronica prostrata | + |
| FESTUCO-BROMETEA | | | |
| H | P-M | Stachys recta | + |
| H | P | Eryngium campestre | + |
| Ch | Ec | Thymus pannonicus | + |
| Th | Eua | Bromus hordeaceus | + |
| G-H | Eua | Carex praecox | + |
| H | Eua | Ajuga genevensis | + |
| G | M-Ec | Ornithogalum umbellatum | + |
| Th | E | Cerastium semidecandrum | + |
| H | Adv | Medicago sativa | + |
| H | Eua | Potentilla argentea | + |
| H | Eua (M) | Euphorbia seguierana | + |
| Th | Eua | Erodium cicutarium | + |
| FESTUCETALIA VAGINATAE | | | |
| G | Eua | Iris arenaria | +/-1 |
| Th | P-M | Viola kitaibeliana | + |
| Th | Eua | Viola arvensis | + |
| FESTUCO-SEDETALIA | | | |
| Th | Eua (C) | Veronica dillenii | + |
| CORYNEPHORETALIA | | | |
| H | Eua | Rumex tenuifolius | + |
| FESTUCION-VAGINATAE | | | |
| Th | E (C) | Anthemis ruthenica | + |
| SECALIETEA | | | |
| Th | Eua | Vicia tetrasperma | + |

The survey's place and date: Urziceni, "Grădina cailor" (May, 9th 2008)